Listing of the Claims

1. (Currently Amended) A two-dimensional radiation detector ~~(30)~~ for a radiographic scanner ~~(12)~~, the radiation detector ~~(30)~~ comprising:

a first aligning means ~~(70, 86)~~ for aligning an anti-scatter module ~~(78)~~ with a spatial focus ~~(74)~~;

a second aligning means ~~(160, 128, 162)~~ for aligning the anti-scatter module ~~(78)~~ with:

a detector subassembly module ~~(100)~~, each detector subassembly module ~~(100)~~ including a substrate ~~(102)~~ and an array ~~(104)~~ of detector elements arranged on the substrate ~~(102)~~ to detect radiation, and

a radiation absorbing mask ~~(120)~~ formed as a grid ~~(122, 130)~~ and arranged between the array ~~(104)~~ of the detector elements and the anti-scatter module ~~(78)~~.

2. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 1, wherein the second aligning means includes:

alignment openings ~~(162)~~ disposed on the substrate ~~(102)~~;

alignment openings ~~(128)~~ disposed on the radiation absorbing mask ~~(120)~~; and

alignment pins ~~(160)~~ disposed on the anti-scatter module ~~(78)~~, such that inserting the pins ~~(160)~~ into the radiation absorbing mask alignment openings ~~(128)~~ and the substrate alignment openings ~~(162)~~ aligns the detector element array ~~(104)~~ with the radiation absorbing mask ~~(120)~~ and the anti-scatter module ~~(78)~~.

3. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 2, wherein the radiation absorbing mask ~~(120)~~ is formed of a radiation absorbing material.

4. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 2, further including:

one or more of additional radiation absorbing masks ~~(120)~~ stacked on the alignment pins ~~(160)~~.

5. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 4, wherein the radiation absorbing mask ~~(120)~~ has stepped edges ~~(134)~~, which interleave with stepped edges of adjacent radiation absorbing masks.

6. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 1, wherein the anti-scatter module ~~(78)~~ includes:

a plurality of anti-scatter vanes ~~(80)~~ formed of a material which is substantially absorbing for radiation produced by the radiographic scanner ~~(12)~~.

7. (Currently Amended) The radiation detector (30) as set forth in claim 4, wherein the radiation absorbing mask ~~(120)~~ includes:

first strips ~~(122)~~ parallel to the anti-scatter vanes ~~(80)~~, which first strips are wider than a thickness of the anti-scatter vanes ~~(80)~~ and are equal or greater than a gap ~~(124)~~ between the elements of the detector array ~~(104)~~.

8. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 1, wherein the radiation absorbing mask ~~(120)~~ includes:

second strips ~~(130)~~ perpendicular to the anti-scatter vanes ~~(80)~~, which second strips are of substantially a same dimension as a gap ~~(132)~~ between the detector elements.

9. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 6, wherein the radiation absorbing mask ~~(120)~~ has stepped edges ~~(134)~~, which interleave with stepped edges of adjacent radiation absorbing masks.

10. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 1, wherein the radiation absorbing mask ~~(120)~~ defines precise apertures ~~(126)~~, which align with and set a resolution of the elements of the detector array ~~(104)~~.

11. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 10, wherein the apertures ~~(126)~~ are precisely defined by photochemical etching.

12. (Currently Amended) The radiation detector ~~(30)~~ as set forth in claim 1, wherein the detector element array ~~(104)~~ includes:

a scintillation array ~~(108)~~ that produce scintillation events responsive to radiation produced by the radiographic scanner ~~(12)~~; and

a photodetector element array ~~(114)~~, each photodetector element ~~(112)~~ of the array ~~(114)~~ being arranged to view one of the scintillation elements ~~(110)~~ of the scintillation array ~~(108)~~ to convert light from the scintillation events into electrical signals.

13. (Currently Amended) The radiation detector as set forth in claim 11, wherein the scintillation element array ~~(108)~~ is arranged in a two-dimensional rectangular array with a rectangular array of interfaces between adjoining scintillation elements and the radiation absorbing mask ~~(120)~~ includes:

a rectangular array of strips ~~(122, 130)~~ of a radiation absorbent material that defines the grid, the strips overlying interfaces ~~(124, 132)~~ between adjacent scintillation elements.

14. (Currently Amended) A computed tomography scanner ~~(12)~~ including:

an x-ray source ~~(14)~~ mounted to rotate about an examination region ~~(18)~~, the x-ray source emitting a cone shaped x-ray beam from a radiation focal point and traversing the examination region ~~(18)~~;

a two-dimensional radiation detector ~~(30)~~ which receives the cone beam of radiation that has traversed the examination region, the radiation detector ~~(30)~~ including a plurality of detector modules ~~(32)~~, each detector module including:

an anti-scatter module ~~(78)~~,

a detector subassembly module ~~(100)~~ aligned with the anti-scatter module ~~(78)~~, each detector subassembly module ~~(100)~~ including a substrate ~~(102)~~ and an array ~~(104)~~ of detector elements arranged on the substrate ~~(102)~~ to detect radiation, and

a radiation absorbing mask ~~(120)~~ formed as a grid ~~(122, 130)~~, the mask being arranged between and aligned with the array ~~(104)~~ of the detector elements and the anti-scatter module ~~(78)~~; and

a reconstruction processor ~~(42)~~ for reconstructing signals from the detector element array ~~(104)~~ into a volumetric image.

15. (Currently Amended) A method for manufacturing a radiation detector ~~(30)~~ for a computed tomography scanner ~~(12)~~, the method comprising:
aligning an anti-scatter module ~~(78)~~ with:

a detector subassembly module ~~(100)~~ including a substrate ~~(102)~~ and an array ~~(104)~~ of detector elements arranged on the substrate ~~(102)~~ to detect radiation, and

a radiation absorbing mask ~~(120)~~ disposed between the anti-scatter module ~~(78)~~ and the detector elements of the array ~~(104)~~.

16. (Currently Amended) The method as set forth in claim 14, further including:

forming a radiation absorbing mask ~~(120)~~ by photoetching a radiation opaque material to define a grid.

17. (Currently Amended) The method as set forth in claim 14, wherein the anti-scatter module includes extending alignment pins ~~(160)~~ and the aligning step includes:

inserting the alignment pins through alignment openings ~~(128)~~ in the mask and alignment openings ~~(162)~~ in the detector subassembly module ~~(100)~~.

18. (Currently Amended) The method as set forth in claim 17, wherein the scanner ~~(12)~~ includes an x-ray source ~~(14)~~ on a rotating gantry ~~(22)~~ that produces a cone of x-rays, which pass through an examination region ~~(18)~~ and strike the radiation detector ~~(30)~~, the method further including:

mounting the anti-scatter module ~~(78)~~ onto the computed tomography scanner ~~(12)~~, with a spatial focal point ~~(74)~~ of the anti-scatter module being aligned with a focal point of the x-ray source prior to inserting the pins ~~(160)~~ into the alignment openings ~~(128, 162)~~ of the mask and the detector subassembly module ~~(100)~~.

19. (Currently Amended) The method as set forth in claim 17, wherein as the pins are inserted in the alignment openings ~~(128)~~ of the radiation absorbing mask ~~(120)~~, edges of adjacent radiation absorbing masks ~~(120)~~ are interleaved.

20. (Currently Amended) The method as set forth in claim 15, further including:

defining uniform apertures ~~(126)~~ in the radiation absorbing mask ~~(120)~~ to precisely fix an amount of radiation received by each detector element of the array ~~(104)~~.

21. (Currently Amended) An alignment apparatus ~~(78, 120)~~ for a radiation detector ~~(30)~~ of a radiographic scanner ~~(12)~~, the radiation detector ~~(30)~~ includes a plurality of detector modules ~~(32)~~, each detector module ~~(32)~~ including:

an anti-scatter module ~~(78)~~, including a plurality of vanes ~~(80)~~; and

a rectangular grid ~~(122, 130)~~ including:

a plurality of wider strips ~~(122)~~, arranged parallel to each other, each wider strip being wider than a width of each vane ~~(80)~~, and

a plurality of thinner strips ~~(130)~~, the plurality of thinner strips ~~(130)~~ being arranged perpendicular to the wider strips ~~(122)~~ to form uniform openings ~~(126)~~, each wider strip ~~(122)~~ is aligned with a corresponding vane ~~(80)~~.

22. (Currently Amended) The apparatus as set forth in claim 21, further including:

a detector array ~~(104)~~ including a plurality of detector elements arranged to form a multi-dimensional rectangular array, each two adjoining detector elements of the array ~~(104)~~ being separated by interfaces ~~(124, 132)~~, the interfaces ~~(124, 132)~~ are aligned with the rectangular grid ~~(122, 130)~~ to place the grid openings ~~(126)~~ between the vanes ~~(80)~~ and the detector elements of the array ~~(104)~~ to define resolution of the radiographic scanner ~~(12)~~.